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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,039	12/01/2003	Bruno Ghyselen	4717-8600	2668

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WINSTON & STRAWN LLP
1700 K STREET, N.W.
WASHINGTON, DC 20006

EXAMINER	
LE, DUNG ANH	

ART UNIT	PAPER NUMBER
2818	

DATE MAILED: 04/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

EF

Office Action Summary	Application No.	Applicant(s)	
	10/726,039	GHYSELEN ET AL.	
	Examiner	Art Unit	
	DUNG A. LE	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-28 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-9,14-22,27 and 28 is/are rejected.

7)☒ Claim(s) 10-13 and 23-26 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 01 December 2003 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DL

DETAILED ACTION

Priority

Acknowledge is made of applicants' claim for foreign priority base on an application 0210588 filed in France on 08/26/2002.

Oath/Declaration

The oath/declaration filed on 12/1/2003 is acceptable.

Information Disclosure Statement

This office acknowledges of the following items from the Applicant:

Information Disclosure Statement (IDS) filed on 4/21/04, 5/18/2004 and 07/20/2004 and made of record . The references cited on the PTOL 1449 form have been considered.

Drawings

The drawings are objected to for the following reasons.

Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Reference sign "8" (see Specification, page 40, line 10) is not included in the drawings (see 37 CFR § 1.84p). Correction is required.

Specification

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

Claims 1, 25 and 26 are objected to because of the following informalities:

In claim 1, line 11, page 25, change " a useful layer " to -- a new useful layer -- in order to particularly define the subject matter which Applicants regard as the invention.

In claim 25, line 30, page 28, change " 25 " to -- 27 -- in order to particularly define the subject matter which Applicants regard as the invention.

In claim 26, line 1, page 29, change " 26 " to -- 28 -- in order to particularly define the subject matter which Applicants regard as the invention.

Claim Rejections

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9, 14- 22 and 27- 28 are rejected under 35 USC 102 (b) as being anticipated by Kakizaki et al. (6,326,279 B1).

Kakizaki et al. teaches a method (figs 1A- 1K) of recycling a donor wafer 11 after detachment of a useful layer 14 of a semiconductor material therefrom, wherein the donor wafer 11, after detachment of the useful layer 14, includes a substrate 16, a buffer structure 12/13 on the substrate 11 and a remaining portion 13B of the useful layer 13, which method comprises mechanically removing (col 9, lines 1- 20; col 16, lines 5- 10) at least part of the remaining portion of the useful layer 13 in order to provide a donor wafer surface that is suitable for use in a subsequent detachment of a useful layer.

Regarding claim 2, wherein the mechanically removing comprises polishing, optionally accompanied by chemical etching (col 9 , lines 1- 5).

Regarding claim 3, wherein the polishing is abrasive polishing or chemical-mechanical planarization (col 14, lins 1-20).

Regarding claim 4, which further comprises conducting a surface smoothing treatment before polishing, after polishing, or both before and after polishing. (col 9, lines 5-10)

Regarding claim 5, wherein the surface smoothing treatment includes a heat treatment (col 14, line 5).

Regarding claim 6, wherein, before detachment, the buffer structure includes a buffer layer 12 and an additional layer 13 that has (a) a thickness which is sufficient to contain defects therein or (b) a surface lattice parameter which is substantially different from that of the substrate (fig. 1C, col 6, lines 30-50, also fig. 3C).

Regarding claim 7, wherein the mechanically removing includes removing all of the remaining portion of the useful layer 14 and part of the additional layer 13 or all of the additional layer and part of the buffer layer (fig.1H-1I).

Regarding claim 8, which further comprises providing at least one new layer 13 on the donor wafer after mechanically removing at least part of the remaining portion of the useful layer so as to form a new useful layer or new buffer structure above the existing buffer structure (fig. 1C)

Regarding claim 9, which further comprises, before detachment, providing the donor wafer with an overlayer 15 (fig. 1E) which includes the useful layer 14 to be detached, and wherein the mechanically removing removes any portion of the overlayer that remains after detachment.

Regarding claim 14, wherein (a) the substrate 11 includes Si and the buffer structure 12/13 includes a SiGe buffer layer having a Ge concentration that increases with thickness and a relaxed SiGe layer on the buffer layer (col 5 ,lines 35-60); (b) the substrate includes AsGa and the buffer structure comprises a buffer layer comprising an atomic alloy of Group III-V elements of ternary or higher degree that is selected from possible (Al,Ga,In)-(N,P,As) combinations with at least two additional elements selected from the group consisting of Group III and Group V elements, wherein the two additional elements have concentration that changes gradually with thickness of the buffer layer (col 5 ,lines 25-30); (c) the donor wafer has at least one layer that includes carbon with a carboconcentration in the layer which is less than or equal to about 50% (col 5 ,lines 25-30); or (d) the donor wafer has at least one layer that includes carbon with a carbon concentration in the layer which is less than or equal to about 5% (col 5, lines 25-30) .

Regarding claim 15, which further comprises: providing a zone of weakness 13beneath the donor wafer surface; bonding the donor wafer surface to a surface of a receiving substrate 16; and detaching a useful layer 14 from the donor wafer along the zone of weakness 13 (fig. 1H).

Regarding claim 16, wherein the method further comprises, before the bonding step, forming a bonding layer 15 on the donor wafer surface.

Regarding claim 17, wherein the zone of weakness 13 is formed by implantation of atomic species or by porosification (col 6, lines 25- 35).

Regarding claim 18, wherein the useful layer 14 that is detached includes part of the buffer structure 12/13.

Regarding claim 19, wherein the donor wafer includes, before detachment, an overlayer 15 located on the buffer structure, and the useful layer 14 that is detached includes at least part of the overlayer (fig. 1E).

Regarding claim 20, a donor wafer produced according to the method of claim 1 (Figs. 1j and 1B).

Regarding claim 21, wherein all of the useful layer 14 is removed so that only the substrate and the buffer structure 12 is present.

Regarding claim 22, wherein the buffer structure 12 includes a buffer layer 12 and an additional layer 13, with the additional layer 13 having a thickness which is sufficient to contain defects or having a surface lattice parameter which is substantially different from that of the substrate, and a portion of the additional layer 13B remains on the buffer structure (figs. 1H and 3H)).

Regarding claim 27 (original second claim 25), wherein the buffer structure has a composition that includes an atomic alloy of binary, ternary, quaternary or of higher degree, selected from the group consisting of Group IV-IV elements; Group III-V elements, and Group II-VI elements (col 5, lines 55-60).

Regarding claim 28 (original second claim 26), wherein (a) the substrate includes Si (col 1, lines 20-30) and the buffer structure includes a SiGe buffer layer having a Ge concentration that increases with thickness and a relaxed SiGe layer on the buffer layer

(col 5, lines 55-60); (b) the substrate includes AsGa and the buffer structure comprises a buffer layer comprising an atomic alloy of Group III-V elements of ternary or higher degree that is selected from possible (Al,Ga,In)-(N,P,As) combinations with at least two additional elements selected from the group consisting of Group III and Group V elements, wherein the two additional elements have a concentration that changes gradually with thickness of the buffer layer; (c) the donor wafer has at least one layer that includes carbon with a carbon concentration in the layer which is less than or equal to about 50%; or (d) the donor wafer has at least one layer that includes carbon with a carbon concentration in the layer which is less than or equal to about 5%.

Reasons for Indication of Allowable Subject Matter

Claims 10, 11-13, 23- 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Kakizaki et al. (U.S. Patent No. 6326279 B1) and Background of Invention, taken individually or in combination, do not teach the claimed invention having **(Regarding claim 10),** wherein the overlayer includes (a) a material selected from the group consisting of SiGe and strained Si; (b) a material selected from the group consisting of AsGa and Ge; or (c) InP or another alloy of Group III-V elements; **(Regarding claim 11),** which further comprises providing at least two new layers and on the donor wafer after mechanically removing at least part of the remaining

portion of the useful layer so as to form an interlayer between the buffer structure and the new useful layer, with the interlayer optionally being provided by layer growth; (**Regarding claim 23**), wherein the buffer structure includes an overlayer and a portion of the overlayer remains on the buffer structure.

If Applicants are aware of better art than that which has been cited, they are required to call such to attention of the examiner.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is (571) 272-1784. The examiner can normally be reached on Monday-Tuesday and Thursday 6:00am- 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUNG A. LE
Primary Examiner
Art Unit 2818